Ultra-Low Power CMOS-compatible Integrated Photonic Platform for Terabit-Scale Communications

Completed Technology Project (2016 - 2020)

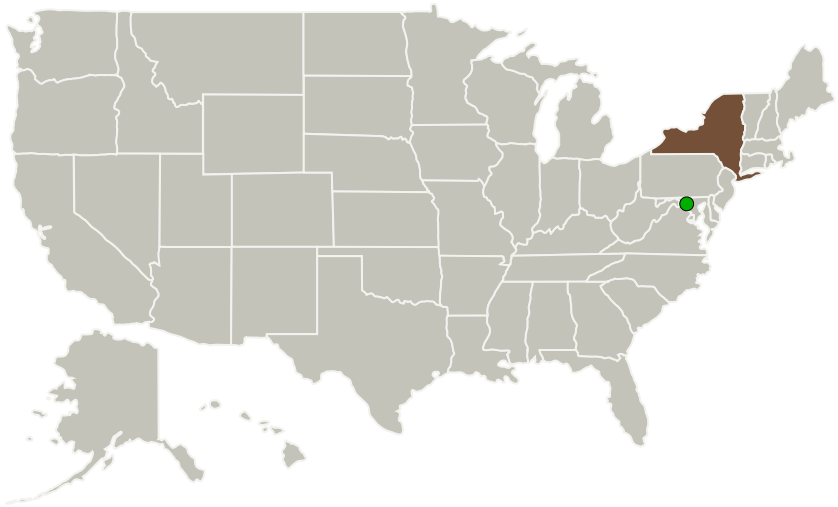
Project Introduction

Current state-of-the-art free space laser links used for satellite communications are severely limited in speeds primarily due to the high power consumption of the optical transceivers. In this project we exploit recent breakthrough 3D monolithic integration of photonic structures, particularly high-speed graphene-silicon devices on CMOS electronics to create CMOS-compatible high-bandwidth transceivers for ultra-low power Terabit-scale optical communications. The new platform can enable implementation of graphene-silicon structures with unprecedented data modulation speeds, offering an optical space communications infrastructure within a compact power envelope.

Anticipated Benefits

This new platform can enable implementation of graphene-silicon structures with unprecedented data modulation speeds, offering an optical space communications infrastructure within a compact power envelope.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Columbia University in the City of New York	Lead Organization	Academia	New York, New York
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
New York

Project Website:

https://www.nasa.gov/strg#.VQb6T0jJzyE

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Columbia University in the City of New York

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

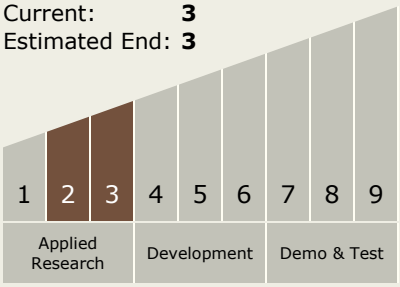
Hung D Nguyen

Principal Investigator:

Keren Bergman

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.7 Innovative Signal Modulations

Target Destination

Earth